METEOROLOGICAL AND CLIMATOLOGICAL DATA FOR MAY 1943

[Climate and Crop Weather Division, J. B. KINCER, in charge]

AEROLOGICAL OBSERVATIONS

NOTICE.—Effective with the December 1942 issue, the publication of table 1 (RAOB summaries) was discontinued indefinitely.—EDITOR.

TABLE 2.—*Free-air resultant winds based on pilot-balloon observations made near 5 p. m. (75th meridian time) during May 1943. Directions given in degrees from north (N=360°, E=90°, S=180°, W=270°). Velocities in meters per second*

Altitude (meters) m. s. l.	Abilene, Tex. (538 m.)			Albuquerque, N. Mex. (1,630 m.)			Atlanta, Ga. (299 m.)			Billings, Mont. (1,095 m.)			Bismarck, N. Dak. (512 m.)			Boise, Idaho (870 m.)			Brownsville, Tex. (7 m.)			Buffalo, N. Y. (220 m.)			Burlington, Vt. (132 m.)			Charleston, S. C. (17 m.)			Cincinnati, Ohio (152 m.)			Denver, Colo. (1,627 m.)			El Paso, Tex. (1,196 m.)		
	Observations	Direction	Velocity	Observations	Direction	Velocity	Observations	Direction	Velocity	Observations	Direction	Velocity	Observations	Direction	Velocity	Observations	Direction	Velocity	Observations	Direction	Velocity	Observations	Direction	Velocity	Observations	Direction	Velocity	Observations	Direction	Velocity	Observations	Direction	Velocity	Observations	Direction	Velocity	Observations	Direction	Velocity
Surface	29	187	2.7	30	235	3.4	30	194	1.2	31	308	1.8	31	301	1.3	30	323	5.2	31	129	7.3	27	213	3.9	30	208	1.4	30	172	1.8	30	245	1.1	29	342	1.4	31	232	4.8
500	---	---	---	---	---	---	30	215	1.3	---	---	---	---	---	---	---	---	---	31	138	8.4	27	236	5.3	30	218	2.4	30	179	3.9	30	236	3.5	---	---	---	---	---	---
1,000	28	191	4.8	---	---	---	30	240	2.1	---	---	---	31	293	1.7	30	318	5.8	23	144	6.9	25	244	6.2	29	243	3.1	29	214	2.5	27	232	6.7	---	---	---	---	---	---
1,500	26	193	6.0	---	---	---	29	253	2.4	31	308	2.7	28	267	2.6	30	310	5.7	19	165	5.9	20	253	7.4	27	262	4.1	28	286	2.1	25	239	6.9	---	---	---	31	241	4.5
2,000	24	211	6.2	30	245	4.3	27	271	4.4	30	301	2.7	23	266	3.9	30	305	5.6	14	162	4.1	15	266	6.7	20	274	7.6	25	308	3.4	17	258	9.1	29	354	1.7	31	245	4.3
2,500	23	216	7.5	30	247	4.7	25	276	5.8	28	291	4.4	21	261	4.6	28	288	5.0	14	186	2.2	11	270	6.4	14	282	8.3	24	312	4.2	14	263	12.2	28	336	1.0	31	249	5.0
3,000	21	225	7.8	30	254	5.9	24	282	6.5	28	288	5.6	19	271	7.2	26	286	4.9	13	216	1.7	---	---	---	12	293	10.9	23	309	4.4	10	274	10.6	24	263	2.9	31	242	5.6
4,000	19	255	8.9	28	255	9.4	20	282	9.0	18	277	8.6	15	268	8.2	24	278	6.7	11	270	1.9	---	---	---	---	---	---	18	295	7.4	---	---	---	20	274	8.4	29	249	8.8
5,000	17	264	10.7	24	260	13.7	18	283	9.7	12	273	10.4	13	269	10.6	21	287	9.9	11	294	4.2	---	---	---	---	---	---	17	303	8.0	---	---	---	15	273	11.8	29	250	9.9
6,000	14	268	12.6	20	260	16.7	16	285	11.4	10	282	11.8	---	---	---	20	279	13.5	11	287	4.2	---	---	---	---	---	---	15	290	9.6	---	---	---	13	278	13.6	26	258	10.7
8,000	12	263	12.7	15	266	15.0	14	291	13.8	10	271	14.5	---	---	---	14	287	18.7	---	---	---	---	---	---	---	---	---	12	305	11.6	---	---	---	---	---	---	25	256	14.9
10,000	---	---	---	---	---	---	12	285	16.6	---	---	---	---	---	---	10	271	24.4	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	16	269	12.4
12,000	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	13	274	11.1

Altitude (meters) m. s. l.	Ely, Nev. (1,910 m.)			Grand Junction, Colo. (1,413 m.)			Greensboro, N. C. (271 m.)			Havre, Mont. (767 m.)			Jacksonville, Fla. (16 m.)			Joliet, Ill. (178 m.)			Las Vegas, Nev. (573 m.)			Little Rock, Ark. (88 m.)			Medford, Oreg. (410 m.)			Miami, Fla. (15 m.)			Mobile, Ala. (66 m.)			Nashville, Tenn. (194 m.)			New York, N. Y. (15 m.)		
	Observations	Direction	Velocity	Observations	Direction	Velocity	Observations	Direction	Velocity	Observations	Direction	Velocity	Observations	Direction	Velocity	Observations	Direction	Velocity	Observations	Direction	Velocity	Observations	Direction	Velocity	Observations	Direction	Velocity	Observations	Direction	Velocity	Observations	Direction	Velocity	Observations	Direction	Velocity	Observations	Direction	Velocity
Surface	31	293	2.3	30	310	1.6	30	212	2.0	29	283	2.0	30	106	4.9	25	266	2.2	31	220	1.5	29	191	2.0	31	308	2.1	30	114	3.2	27	164	2.1	31	221	2.1	29	199	2.6
500	---	---	---	---	---	---	30	220	3.3	---	---	---	30	107	3.7	25	245	3.0	---	---	---	29	196	3.0	31	310	2.6	30	112	5.0	27	172	2.5	31	221	3.4	29	234	3.4
1,000	---	---	---	---	---	---	29	242	4.1	29	276	2.0	28	161	0.8	23	256	3.8	31	208	3.0	28	206	5.0	31	313	2.7	24	106	2.7	22	211	1.3	29	216	4.2	29	257	4.6
1,500	---	---	---	30	296	2.4	29	253	4.7	29	281	2.8	27	294	1.4	20	279	6.1	31	224	3.1	27	226	6.5	31	303	2.3	23	[illegible]	1.5	18	280	0.8	29	228	4.7	28	270	6.5
2,000	31	285	2.9	30	281	4.0	26	280	6.5	28	264	3.2	26	317	2.4	18	272	8.1	31	237	3.5	22	237	6.8	30	294	2.0	20	[illegible]	1.5	17	295	1.4	27	243	6.1	24	273	8.2
2,500	31	282	3.0	30	269	4.6	25	290	7.7	24	259	5.3	26	325	3.2	17	279	10.2	31	251	4.1	19	258	7.5	26	337	2.5	17	44	1.7	14	327	2.1	26	249	8.4	18	284	10.4
3,000	30	276	3.6	30	257	5.7	23	289	9.4	19	252	6.6	24	310	2.9	15	278	10.6	31	273	5.1	14	261	7.9	25	320	4.5	16	58	1.9	14	325	2.5	20	267	11.3	14	294	11.3
4,000	27	265	5.3	27	241	6.8	21	284	11.8	---	---	---	22	292	3.4	---	---	---	30	281	8.9	12	260	9.8	22	304	7.6	16	16	1.9	12	331	3.6	15	279	14.1	---	---	---
5,000	23	271	10.5	14	277	9.2	18	287	12.8	---	---	---	20	284	4.3	---	---	---	28	285	10.2	11	268	11.1	19	300	10.6	13	306	0.4	10	319	4.5	12	281	14.7	---	---	---
6,000	23	283	13.7	10	265	8.4	18	287	14.2	---	---	---	18	289	5.8	---	---	---	28	282	11.7	---	---	---	18	296	14.4	11	344	2.5	---	---	---	10	285	16.3	---	---	---
8,000	12	291	18.4	---	---	---	14	290	16.7	---	---	---	17	292	10.2	---	---	---	26	280	18.2	---	---	---	14	303	18.2	---	---	---	---	---	---	---	---	---	---	---	---
10,000	---	---	---	---	---	---	12	285	16.4	---	---	---	14	306	12.6	---	---	---	25	272	21.1	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
12,000	---	---	---	---	---	---	---	---	---	---	---	---	12	308	17.0	---	---	---	16	284	20.2	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
14,000	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	10	276	12.2	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---

Altitude (meters), m. s. l.	Oakland Calif. (8 m.)			Oklahoma City, Okla. (402 m.)			Omaha, Nebr. (306 m.)			Phoenix Ariz. (388 m.)			Rapid City S. Dak. (982 m.)			St. Louis Mo. (181 m.)			St. Paul, Minn. (225 m.)			San Antonio, Tex. (240 m.)			San Diego, Calif. (15 m.)			Sault Ste. Marie, (230 m.) Mich.			Seattle, Wash. (12 m.)			Spokane, Wash. (603 m.)			Washington, D. C. (24 m.)		
	Observations	Direction	Velocity	Observations	Direction	Velocity	Observations	Direction	Velocity	Observations	Direction	Velocity	Observations	Direction	Velocity	Observations	Direction	Velocity	Observations	Direction	Velocity	Observations	Direction	Velocity	Observations	Direction	Velocity	Observations	Direction	Velocity	Observations	Direction	Velocity	Observations	Direction	Velocity	Observations	Direction	Velocity
Surface	30	269	5.9	22	183	4.7	30	130	0.6	31	260	1.5	31	352	2.0	30	201	1.4	29	257	1.8	31	144	4.8	31	266	3.8	28	291	2.7	31	239	1.9	31	245	3.3	31	216	1.4
500	30	310	3.4	22	186	5.9	30	158	1.0	31	268	3.1	---	---	---	30	216	1.7	29	239	1.8	31	150	5.7	31	286	3.5	28	290	2.6	31	233	2.2	---	---	---	31	252	2.2
1,000	30	324	3.2	22	193	6.6	30	187	1.8	31	255	3.3	31	349	2.0	26	210	3.7	28	240	2.5	31	158	6.3	23	307	2.5	27	293	2.9	28	230	2.2	31	241	3.9	31	246	4.3
1,500	30	328	4.6	21	208	8.6	27	218	3.1	31	244	3.8	31	325	2.1	22	232	6.4	24	221	3.1	29	175	5.8	21	304	2.2	24	290	4.0	23	242	2.6	31	247	4.6	28	260	5.6
2,000	29	327	3.7	21	228	10.2	24	252	5.6	31	239	4.3	29	307	2.2	20	240	7.7	23	237	4.0	26	190	4.5	20	291	2.4	21	289	5.0	20	237	2.6	27	244	5.0	25	268	7.7
2,500	29	330	5.1	18	244	10.6	17	258	6.6	31	240	5.3	27	274	3.5	15	254	9.9	18	241	5.0	19	215	4.9	20	285	3.3	20	293	6.3	16	255	3.9	23	252	5.1	22	268	8.7
3,000	29	321	5.3	17	245	13.6	17	260	7.7	31	245	5.9	19	273	5.4	12	257	12.6	14	253	6.0	19	239	4.8	20	269	4.3	19	290	8.9	14	267	4.3	19	241	5.3	19	269	11.0
4,000	29	310	8.4	13	263	13.8	10	280	11.1	30	255	9.2	12	256	5.8	10	275	15.5	---	---	---	17	264	5.2	16	277	6.4	13	311	7.9	10	275	5.2	14	263	6.2	14	265	11.5
5,000	28	307	10.2	13	268	14.8	---	---	---	30	265	9.9	---	---	---	---	---	---	---	---	---	12	275	5.0	16	276	7.7	11	310	12.3	---	---	---	---	---	---	10	267	15.0
6,000	27	298	12.8	12	267	15.3	---	---	---	28	276	10.7	---	---	---	---	---	---	---	---	---	10	282	8.4	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
8,000	22	285	14.1	---	---	---	---	---	---	20	304	13.0	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
10,000	17	287	13.4	---	---	---	---	---	---	15	296	15.5	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---
12,000	14	288	13.2	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---

TABLE 3.—*Maximum free-air wind velocities (M. P. S.), for different sections of the United States, based on pilot-balloon observations during May 1943*

Section	Surface to 2,500 meters (m. s. l.)					Between 2,500 and 5,000 meters (m. s. l.)					Above 5,000 meters (m. s. l.)				
	Maximum velocity	Direction	Altitude (m.) m. s. l.	Date	Station	Maximum velocity	Direction	Altitude (m.) m. s. l.	Date	Station	Maximum velocity	Direction	Altitude (m.) m. s. l.	Date	Station
Northeast [1]	39.1	w.	1,570	7	Philipsburg, Pa.	46.0	w.	4,780	14	Boston, Mass.	75.2	wnw.	8,120	10	Caribou, Maine.
East-Central [2]	37.1	ssw.	1,290	11	Knoxville, Tenn.	44.0	w.	5,000	3	Huntington, W. Va.	56.6	nw.	9,460	1	Huntington, W. Va.
Southeast [3]	26.3	ssw.	1,010	11	Charleston, S. C.	27.2	sw.	4,600	25	Jacksonville, Fla.	50.0	w.	13,990	1	Miami, Fla.
North-Central [4]	39.2	wsw.	2,500	16	Detroit, Mich.	45.2	w.	4,780	13	Alpena, Mich.	55.0	nnw.	8,680	4	Sault Ste. Marie, Mich
Central [5]	43.2	wsw.	1,960	2	Wichita, Kans.	47.5	sw.	3,200	5	St. Louis, Mo.	47.2	w.	13,210	11	Wichita, Kans.
South-Central [6]	37.0	s.	2,000	5	Texarkana, Ark.	39.2	n.	3,440	25	Texarkana, Ark.	67.5	w.	12,000	11	Oklahoma City, Okla.
Northwest [7]	37.4	w.	1,340	4	Great Falls, Mont.	41.0	w.	3,910	22	Great Falls, Mont.	64.4	nnw.	9,310	8	Great Falls, Mont.
West-Central [8]	27.3	nne.	2,500	8	Redding, Calif.	41.5	nw.	4,620	7	Winnemucca, Nev.	68.0	w.	6,800	15	Modena, Utah.
Southwest [9]	27.8	w.	2,280	15	Roswell, N. Mex.	38.5	w.	4,910	7	Raton, N. Mex.	68.0	wnw.	11,340	6	Reno, Nev.
											68.0	wsw.	9,670	17	Winslow, Ariz.

[1] Maine, Vermont, New Hampshire, Massachusetts, Rhode Island, Connecticut, New York, New Jersey, Pennsylvania, and Northern Ohio.
[2] Delaware, Maryland, Virginia, West Virginia. Southern Ohio, Kentucky, Eastern Tennessee, and North Carolina.
[3] South Carolina, Georgia, Florida, and Alabama.
[4] Michigan, Wisconsin, Minnesota, North Dakota, and South Dakota.
[5] Indiana, Illinois, Iowa, Nebraska, Kansas, and Missouri.
[6] Mississippi, Arkansas, Louisiana, Oklahoma, Texas (except El Paso), and Western Tennessee.
[7] Montana, Idaho, Washington, and Oregon.
[8] Wyoming, Colorado, Utah, Northern Nevada, and Northern California.
[9] Southern California, Southern Nevada, Arizona, New Mexico, and extreme West Texas.

RIVER STAGES AND FLOODS

By BENNETT SWENSON

Excessive flooding extended over seven States from Oklahoma northeastward to southern Michigan during May, causing great damage in the extensive agricultural and industrial areas of this region. This may be ranked as the most outstanding flood event since the great flood in the Ohio Valley of January-February 1937. Although direct loss of life was relatively small, property and crop damage was especially disastrous.

The floods were caused by unprecedented rains which occurred in most areas, in two general storm periods, the first from May 6 to 11, and the second, May 14 to 20. These storms produced record rainfall for May in the States of Indiana, Illinois, Missouri, and Oklahoma, in which more than twice the normal amount of rain fell.

Elsewhere precipitation during May was generally above normal from the Rocky Mountains eastward except in Louisiana, Mississippi, Alabama, the Carolinas, South Dakota, and Nebraska. The far western States had below-normal precipitation, the far Southwest having less than half the normal amount.

Floods in Central States.—The extensive, and in many cases record-breaking, floods covered the following States: eastern Oklahoma, southeastern Kansas, Missouri, Arkansas, Illinois, Indiana, and southern Michigan. The Neosho (Grand), Illinois, Verdigris, Walnut, Cimarron, and Poteau Rivers, and the Arkansas River from Tulsa, Okla., to the mouth, in the Arkansas Basin; the White River Basin in Arkansas and Missouri; the Osage, Grand, and Gasconade Rivers, and the Missouri River from Jefferson City, Mo., to the mouth, in the Missouri Basin; the Illinois, Kaskaskia, and Meramec Rivers, and the Mississippi River from Grafton, Ill., to New Madrid, Mo., in the upper Mississippi Basin; the entire Wabash River system except the East Fork of the White, and the Maumee River Basin, were the principal rivers affected.

Relatively short-time stage records were exceeded at many places and, as shown in the accompanying table, long-time records were broken at several places along the Illinois River, the Osage River in Missouri, portions of the Wabash River, the Arkansas River from Muskogee, Okla., to Dardanelle, Ark., and tributaries of the Arkansas in Kansas and Oklahoma. Records which have stood since 1833 were broken in the Arkansas River, the stage at Fort Smith, Ark., reaching a peak of 41.7 feet in the first rise on May 23, against a stage of 38.0 feet in 1833. In the Osage River, the great flood of 1844 was exceeded by about 9 feet at Tuscumbia, Mo., and by about 4 feet at St. Thomas, Mo. At St. Louis, Mo., the Mississippi reached a stage of 38.9 feet on May 24, just 2.5 feet below the maximum stage of 1844.

At the beginning of the month river stages were considerably below normal in all of the flood area except that stages in the Missouri and upper Mississippi Rivers were still moderately high from the snow-smelt run-off in April. Thus, conditions were relatively favorable for the retention of water in the basins.

The effective rains began on May 6, when amounts up to more than 5 inches occurred in the Verdigris and Neosho Rivers in Kansas. The precipitation then spread rapidly northeastward to Indiana and southern Michigan and southward into eastern Oklahoma and northern Arkansas. Heavy rains continued until the 12th, when there was a respite from rain in the flood area for several days. Rains began again on May 14, and continued heavy over the same areas until May 20. More scattered rains extended through the remainder of the month but were not particularly effective as far as the floods were concerned.

The meteorological conditions associated with the floods were characterized by the presence of a warm, moist anticyclone centered off the South Atlantic coast, and a cold, dry anticyclone occupying all of the northwestern third of the country.

The region (or trough) of low pressure between the two high-pressure cells, continued to occupy the same general area extending from Texas northeastward to the eastern Great Lakes, throughout the period from early May to the 21st of the month. A stationary front, in the trough of low pressure persisted and minor waves along the front produced a succession of 12- to 24-hour periods of heavy rainfall in areas extending from Oklahoma and Arkansas to southern Michigan.